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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,298	03/01/2004	Khoi A. Phan	H0266 / AMPD812US	9262
23623 7590 11/09/2007 AMIN, TUROC & CALVIN, LLP 1900 EAST 9TH STREET, NATIONAL CITY CENTER 24TH FLOOR, CLEVELAND, OH 44114				
EXAMINER LE, THAO X				
ART UNIT		PAPER NUMBER		
2814				
NOTIFICATION DATE		DELIVERY MODE		
11/09/2007		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

doctet1@thepatentattorneys.com  
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# Office Action Summary

Application No.

10/790,298

Applicant(s)

PHAN ET AL.

Examiner

Thao X. Le

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 7/22/07.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-7, 23 and 25-34 is/are pending in the application.
- 4a) Of the above claim(s) 28-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 23, 25-27 and 32-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-949)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. In view of the Appeal Brief filed on 26 June 2007, PROSECUTION IS HEREBY REOPENED. New ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-7, 23, 25-26, and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5740016 to Dhindsa et al.

Regarding claims 1 and 34, Dhindsa discloses in fig. 1 a heat regulating device for regulating a heat flow into and out of an integrated circuit semiconductor body comprising: a plurality of thermo-electrical (TE) structures (140), that creates a uniform temperature gradient, col. 4 lines 13-22, across an integrated circuit semiconductor body (120) via heat inducement to and/or dissipation of generated heat away from a portion of the integrated circuit semiconductor body, and at least one layer of a conductive material (160) in contact with the thermo-electrical structure 140 for conducting heat flow; and least one of plurality of the TE has a distribution line, fig. 2a, patterns that is concentric.

But, Dhindsa does not disclose a heat regulating device wherein the thermoelectric structure has a structure with a distribution line patterns that is a denser towards center of the structure and a less dense towards outer edges the structure.

However, Dhindsa a heat dissipating structure as depicted in fig. 2a and 2b, the TE modules may be arranged in any desired pattern, col. 5 lines 45-50,

that obviously is including the pattern denser in the center and less dense in the outer edge. In addition, TE had been arranged in many different shapes and forms, such as in Mascris (US 6727422) the TE (76), fig. 13A, is arranged denser in the center, in Bell (US 7231772) the TE (730), fig. 7D, is denser in the center than the outer portion, and in Saika (US 6573596) the TE (12), fig. 3-6, is arranged in various fashions. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use the any desired pattern teaching of Dhindsa as claimed for the purpose of engineering choice and such TE arrangement is typical in the art.

Regarding claim 2, Dhindsa discloses the heat regulating device wherein the thermo-electrical structure (140) is trough within the body of the layer of the conductive material 160, fig. 1.

Regarding claims 3-6, Dhindsa discloses the heat regulating device further comprising a plurality of the thermo-electrical structures (140) connected form a spreading assembly, fig. 1, wherein the spreading assembly is operatively connected to a heat sink (170), fig. 1, wherein the thermo-electrical structure 130 is a conductive pathway for heat transfer, wherein the thermo-electrical structure 130 has a structure selected from a group comprising of maze-shaped structure, fig. 2a.

Regarding claim 7, Dhindsa discloses a heat regulating device for regulating a heat flow of an integrated circuit comprising: means (130), fig. 1, for inducing heat into a portion of a semiconductor body of the integrated circuit (120) utilizing a plurality thermo-electric structures 130, fig. 1, or a means (130) for dissipating heat away from

the portion of the semiconductor region of a semiconductor body of the integrated circuit (120) utilizing a plurality of thermo-electric structure 130; the heat inducing means and or/heat dissipating means create a uniform temperature gradient across the semiconductor body, col. 4 lines 13-22; and heat conducting means (140) in contact with the means 130 for inducing heat into or dissipating heat away from the portion of the semiconductor body of the integrated circuit, and least one of plurality of the TE has a distribution line, fig. 2a, patterns that is concentric.

But, Dhindsa does not disclose a heat regulating device wherein the thermoelectric structure has a structure with a distribution line patterns that is a denser towards center of the structure and a less dense towards outer edges the structure.

However, Dhindsa a heat dissipating structure as depicted in fig. 2a and 2b, the TE modules may be arranged in any desired pattern, col. 5 lines 45-50, that obviously is including the pattern denser in the center and less dense in the outer edge. In addition, TE had been arranged in many different shapes and forms, such as in Mascris (US 6727422) the TE (76), fig. 13A, is arranged denser in the center, in Bell (US 7231772) the TE (730), fig. 7D, is denser in the center than the outer portion, and in Saika (US 6573596) the TE (12), fig. 3-6, is arranged in various fashions. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use the any desired pattern teaching of Dhindsa as claimed for the purpose of engineering choice and such TE arrangement is typical in the art.

Regarding claims 23, 25-26, Dhindsa discloses the heat regulating device with components (130), embedded into the spreading assembly to manage the heat flow away from and/or into the portion of the semiconductor body of the integrated circuit, fig. 1, wherein the thermo-electrical structure (130) being embedded with measuring device (sensor) to measure various physical properties of the portion of the semiconductor body of the integrated circuit, fig. 1, wherein the thermo-electrical structure 130 being external element attached to the surface of the heat regulating device, fig. 1.

Regarding claim 32, Dhindsa discloses a heat regulating device wherein the thermo-electrical structure 130 is a composite, col. 3 lines 55-60, composed of a layer having at least one part tailored to a heat-generating characteristic of a portion of the integrated circuit semiconductor body (120), fig. 1.

Regarding claim 33, Dhindsa discloses a heat regulating device at least one thermo-electric structure 130 is integrated with the semiconductor body (120) such that the thermo-electrical structure (130) is positioned in a region of the semiconductor body where a hot spot (IC would generate heat) is anticipated, fig. 1.

5. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5740016 to Dhindsa et al. in view of US 6105381 to Ghoshal.

Regarding claim 27, Dhindsa does not disclose a heat regulating device fabricated from a combination of various layers of silicon carbide and diamond.

However, Ghoshal discloses a thermo electro deice 454 connects to a diamond, col. 5 lines 38-40. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to replace the material of Dhindsa

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with the diamond material teaching of Ghoshal, because it would have created a high thermal conductivity material as taught by Ghoshal, col. 5 line 40.

***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao X. Le whose telephone number is (571) 272-1708. The examiner can normally be reached on M-F from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on (571) 272 -1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TL  
31 Oct. 2007

/Wael M Fahmy/  
Supervisory Patent Examiner, Art Unit 2814